
Chapter 6 — 2 Mb PRI Implementation

Overview

This chapter provides the information required to install 2 Mb PRI on a Meridian 1 Option 11 system:

- hardware installation
- software programming instructions

ISDN feature implementation is found in the chapter called "ISDN Feature Implementation".

Note: This chapter does not provide installation instructions for DPNSS1 or DASS2. This information is found in the chapter called "DPNSS1/DASS2 Implementation".

This chapter builds on the ESN programming that is assumed to already be in place. Installation technicians should possess a basic understanding of NARS and CDP. (See Appendix B for additional information on ESN). This chapter covers the most common type of Northern Telecom PRI installations.

- 30B+D PRI installation between Meridian 1 PBXs.
- 30B+D PRI installation between Meridian 1 PBX and a public exchange/central office.

Hardware requirements

Circuit cards

To implement 2.0 Mb PRI on the Meridian 1 Option 11, an NTAK79 or an NTBK50 PRI card plus associated daughterboards is required.

Table 28
2.0 Mb PRI hardware requirements

Circuit card	Description
NTBK50	2.0 Mb PRI circuit card Supports the NTAK20 clock controller daughterboard and a D-channel handler interface daughterboard (NTAK93 DCHI or NTBK51 DDCH).
NTAK79	2.0 Mb PRI circuit card Supports an on-board clock controller and an on-board D-channel handler interface.
NTAK20 NTAK93	Clock-controller daughterboard. Option 11 supports only one active clock controller per system. Connects to the NTBK50 PRI card D-Channel-handler interface (DCHI) daughterboard Connects to the NTBK50 PRI card.
NTBK51	Downloadable D-Channel daughterboard (DDCH). Connects to the NTBK50 PRI card.

Cables

The following cables are required for PRI connections:

- CEPT Cable - NTBK05DA (120 ¾ twisted pair—6.15 m length)
- or
- CEPT Cable - NTBK05CA (75 ¾ coaxial—6.15 m length)

Hardware description

2.0 Mb PRI cards

Two PRI cards are available on the Option 11 system:

- NTAK79 2.0 Mb PRI card
- NTBK50 2.0 Mb PRI card

The difference between the two PRI cards is the ability of the NTBK50, when equipped with the NTBK51 D-channel daughterboard, to download software onto the card. This feature is based on the MSDL platform and essentially replaces the D-channel circuit on the NTAK79 PRI card. (The NTAK79 PRI card does not support the NTBK51 Downloadable D-channel handler daughterboard.)

A second difference between the NTAK79 and NTBK50 2.0 Mb PRI cards is that the NTAK79 has an on-board clock controller while the NTBK50 supports the NTAK20 clock controller daughterboard.

Note: If the NTAK93 D-channel daughterboard is attached to the NTBK50 PRI card instead of the NTBK51 Downloadable D-channel daughterboard, the NTBK50 PRI card functions in the same manner as the NTAK79 PRI card.

NTAK79 2 Mb PRI circuit card

The 2 Mb Primary Rate Interface card provides the physical interface for the digital E-1 carrier on the Option 11 system. The card includes an on-board clock controller and on-board D-channel handler. It is installed in slots 1 through 9 in the main cabinet.

For information on the NTAK79 faceplate LEDs, refer to the chapter in this guide called "PRI maintenance". For more information on the operation of the on-board clock controller, refer to the chapter in this guide called "Network clocking"

NTBK50 2 Mb PRI circuit card

The 2 Mb Primary Rate Interface card provides the physical interface for the digital E-1 carrier on the Option 11 system. The card is installed in slots 1 through 9 in the main cabinet and supports clock controller and D-channel handler daughterboards:

- NTAK20 clock controller daughterboard
- NTAK93 D-channel handler daughterboard, or NTBK51 Downloadable D-channel daughterboard.

If the NTAK93 D-channel daughterboard is attached, the NTBK50 PRI card functions in the same manner as the NTAK79 PRI card. If the NTBK51 D-channel daughterboard is attached, software is downloaded to the card instead of residing in a D-channel circuit.

For information on the NTBK50 faceplate LEDs, refer to the chapter in this guide called "PRI maintenance". For more information on the operation of the clock controller, refer to the chapter in this guide called "Network clocking".

NTAK20 Clock Controller (CC) daughterboard

The NTAK20 Clock Controller daughterboard is used with the NTBK50 2.0 Mb PRI card. (The NTAK79 PRI card has an *on-board* clock controller).

Digital Trunking requires synchronized clocking so that a shift in one clock source will result in an equivalent shift of the same size and direction in all parts of the network. On Option 11 systems, synchronization is accomplished with the NTAK20 clock controller circuit card.

The Clock Controller circuitry synchronizes the Option 11 to an external reference clock, and generates and distributes the clock to the system. Option 11 can function either as a slave to an external clock or as a clocking master. The NTAK20AB version of the clock controller meets AT&T Stratum 3 and Bell Canada Node Category D specifications. The NTAK20BB version meets CCITT stratum 4 specifications. See the chapter called *Network clocking* for details.

Shelf slot assignment

On non-ECM system cabinets, the NTAK20 may be placed in slots 1-9. On cabinets NTAK11Dx and NTAK11Fx, the active NTAK20 must be placed in slots 1-3 (slots 4-10 may not be used.)

NTAK93 D-Channel Handler Interface (DCHI) daughterboard

The NTAk93 DCHI daughterboard interfaces with the Meridian 1 Option 11 Central Processing Unit (CPU) and mounts on the NTBk50 PRI card for PRI (but not ISL) applications. The equivalent circuit is contained on-board the NTAk79 2.0 Mb PRI card.

The DCHI is responsible for performing the Q.921 layer 2 protocol information. It transfers layer 3 signaling information between two adjacent network switches.

The NTAk93 DCH daughterboard, when installed on the NTBk50 circuit card, is addressed in the same slot as the NTBk50. The NTAk93 can use SDI I/O addresses 1 to 15 and port 1.

A minimum of one NTAk93 is required for each PRI link. If more than one PRI link is connected to the same end location, a single DCHI circuit card can support up to a maximum of 8 PRI connections for the Option 11 system. This allows for the support of 240 B-Channels or PRI trunks.

NTBK51 Downloadable D-Channel daughterboard

The NTBk51 DDCH daughterboard interfaces with the Meridian 1 Option 11 Central Processing Unit (CPU) and mounts on the NTBk50 2.0 Mb PRI circuit card for PRI D-Channel applications. The DDCH is equivalent to the MSDL card used on the larger Meridian 1 systems, but it only supports D-channel applications (no SDI or ESDI).

The NTBk51 DDCH daughterboard, when installed on the NTBk50 circuit card, is addressed in the same slot as the NTBk50.

A minimum of one NTBk51 is required for each PRI link. If more than one PRI link is connected to the same end location, a single DDCH circuit card can support up to a maximum of 8 PRI connections for the Option 11 system. This allows for the support of 240 B-Channels or PRI trunks.

Installing PRI hardware: NTAK79 PRI card

The steps required to install PRI are as follows:

- 1 Inspect the PRI card
- 2 Set the switches on the PRI card
- 3 Insert the PRI card in the main cabinet (slots 1-9 only)
- 4 Connect the cables

Each of these steps is described in the pages that follow. The PRI hardware installation procedure is the same regardless of the type of system at the far end (i.e. another Meridian 1, AXE-10, SYS-12, etc.).

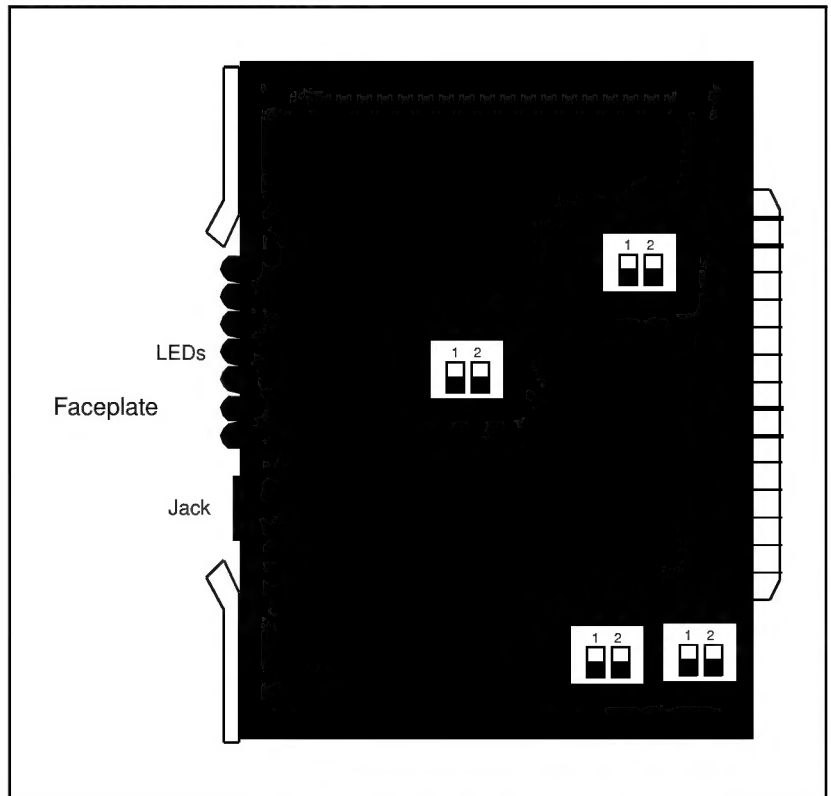
Inspecting the NTAK79 circuit card

- Locate the NTAK79 2 Mb circuit card and carefully remove it from its packaging.
- Inspect the circuit card for any visible damage which may have occurred during shipping.

Setting the switches on the NTAK79

The NTAK79 incorporates four on-board dip switches. The tables that follow provide information on the various settings and related functions of these switches.

Note: The ON position for all the switches is towards the bottom of the card. This is indicated by a white dot printed on the board adjacent to the bottom left corner of each individual switch.

NTAK79 with Switch locations

Set the switches found on the circuit card as per the requirements of your specific installation:

Switch SW1—DCHI Configuration

This switch enables/disables the on-board DCHI and sets the operating mode of the DCHI.

For the U.K., use DPNSS1 mode. For all other countries, use Q.931 mode.

Switch	Down (On)	Up (Off)
SW 1-1	enable DCHI	disable DCHI
SW 1-2	DPNSS1/DASS2	Q.931

Switch SW2—Carrier Impedance Configuration

This switch sets the carrier impedance to either 120 Ω or 75 Ω . Twisted pair cable is usually associated with 120 Ω . Coaxial cable is usually associated with the 75 Ω setting.

Cable Type	SW 2-1	SW 2-2
75 Ω	Up (Off)	Down (On)
120 Ω	Down (On)	Up (Off)

Switch SW3—Clock Controller Configuration

This switch enables/disables (H/W) the on-board Clock Controller. SW 3-2 should be disabled if the on-board clock controller is not in use.

Switch	Down (On)	Up (Off)	Note
SW 3-1	—	—	Spare
SW 3-2	Disabled	Enabled	

Switch SW4—Carrier Shield Grounding

This switch allows for the selective grounding of the Tx and/or Rx pairs of the carrier cable. Closing the switch (down position) applies Frame Ground (FGND) to the coaxial carrier cable shield, creating a 75% unbalanced configuration. This applies only to the NTB05CA cable.

Switch	Down (On)	Up (Off)
SW 4-1	Rx—FGND	Rx—OPEN
SW 4-2	Tx—FGND	Tx—OPEN

Note: The usual method is to ground the outer conductor of the receive coax signal.

Inserting the NTAK79 into the main cabinet

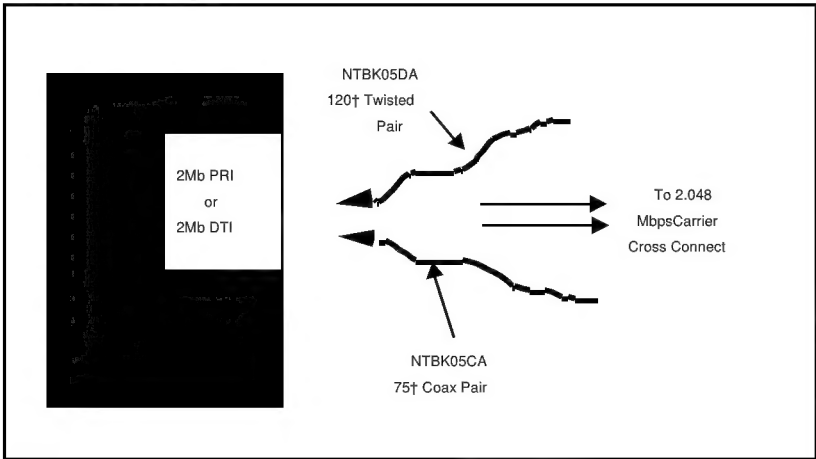
Slide the circuit card into any unused card slot 1 through 9 in the main cabinet. Secure the circuit card in the cabinet by locking the lock latch assemblies. The card number associated with a 2 Mb PRI card is based on the slot in which the card is installed.

Connecting the cables

Follow the instructions below to connect cables to the NTAK79 PRI card.

- In the cabling area, located directly below the card cage, remove the retaining bar used to secure the MDF cables. Connect the NTB05DA/CA interface cable to the 50 pin Amphenol connector below the slot in which the NTAK79 is installed. Re-install the retaining bar to secure the cable(s) in place.
- Terminate the NTB05DA/CA carrier cable as required.

NTAK79 Cabling



NTBK05DA pinouts

The pinouts for the NTBK05DA cable are as follows:

From: 50 pin MDF connector	To: 9 pin connector	Colour	Signal
pin 23	pin 6	Black	R0
pin 48	pin 7	White	T0
pin 50	pin 9	Bare	R0/T0 FGND
pin 24	pin 2	Black	R1
pin 49	pin 3	Red	T1
pin 25	pin 5	Bare	R1/T1 FGND

NTBK05CA pinouts

The pinouts for the NTBK05CA cable are as follows:

From: 50 pin MDF connector	To: Transmit coax connector	To: Receive coax connector	To: 50 pin MDF connector
pin 23	Inner conductor	—	—
pin 48	outer conductor	—	—
pin 24	—	Inner conductor	—
pin 49	—	outer conductor	—

Installing PRI hardware: NTBK50 PRI card

The NTBK50 serves as a motherboard to the NTAk20 clock controller, and either the NTBK51 Downloadable D-Channel handler or the NTAk93 D-channel handler.

The steps required to install PRI are as follows:

- 1** Inspect the PRI card and daughterboards
- 2** Set the switches on the PRI card
- 3** Mount the daughterboard(s) on the PRI card
- 4** Insert the PRI card in the main cabinet
- 5** Connect the cables

Each of these steps is described in the pages that follow. The PRI hardware installation procedure is the same regardless of the type of system at the far end (i.e. another Meridian 1, AXE-10, SYS-12, etc.).

Inspecting the NTBK50 circuit card

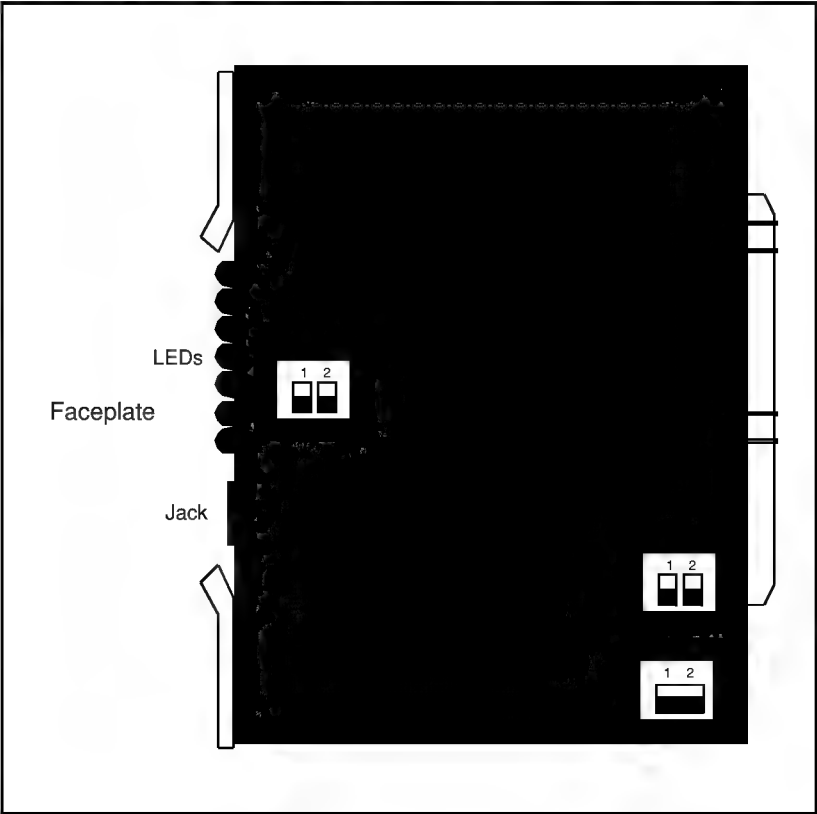
- Locate the NTBK50 2 Mb circuit card plus associated daughterboard(s) and carefully remove them from their packaging.
- Inspect the circuit cards for any visible damage which may have occurred during shipping.

Setting the switches on the NTBK50

The NTBK50 incorporates three on-board dip switches. The following tables provided information on the various settings and related functions of these switches.

Note: The ON position for all the switches is towards the bottom of the card. This is indicated by a white dot printed on the board adjacent to the bottom left corner of each individual switch.

NTBK50 with switch locations



Set the switches found on the circuit card as per the requirements of your specific installation:

Switch SW1—DCHI Configuration (NTAK93 only)

This switch enables/disables the DCHI and sets the operating mode of the DCHI. It is only used if an NTAK93 D-channel handler daughterboard is being used. It has no effect when using the NTBK51 DDCH daughterboard.

For the U.K., use DPNSS1 mode. For all other countries, use Q.931 mode.

Switch	Down (On)	Up (Off)
SW 1-1	—	—
SW 1-2	DPNSS1/DASS2	Q.931

Switch SW2—Carrier Impedance Configuration

This switch sets the carrier impedance to either 120 Ω or 75 Ω . Twisted pair cable is usually associated with 120 Ω . Coaxial cable is usually associated with the 75 Ω setting.

Cable Type	SW 2-1
75 Ω	Down (On)
120 Ω	Up (Off)

Switch SW4—Carrier Shield Grounding

This switch allows for the selective grounding of the Tx and/or Rx pairs of the carrier cable. Closing the switch (down position) applies Frame Ground (FGND) to the coaxial carrier cable shield, creating a 75 Ω unbalanced configuration. This applies only to the NTBK05CA cable.

Switch	Down (On)	Up (Off)
SW 4-1	Rx—FGND	Rx—OPEN
SW 4-2	Tx—FGND	Tx—OPEN

Note: The usual method is to ground the outer conductor of the receive coax signal.

Mounting the daughterboards on the NTB50

Use the following procedure to mount and remove the NTAK20 CC and the NTB51 DDCH or NTAK93 DCHI daughterboards onto the NTB50 PRI.

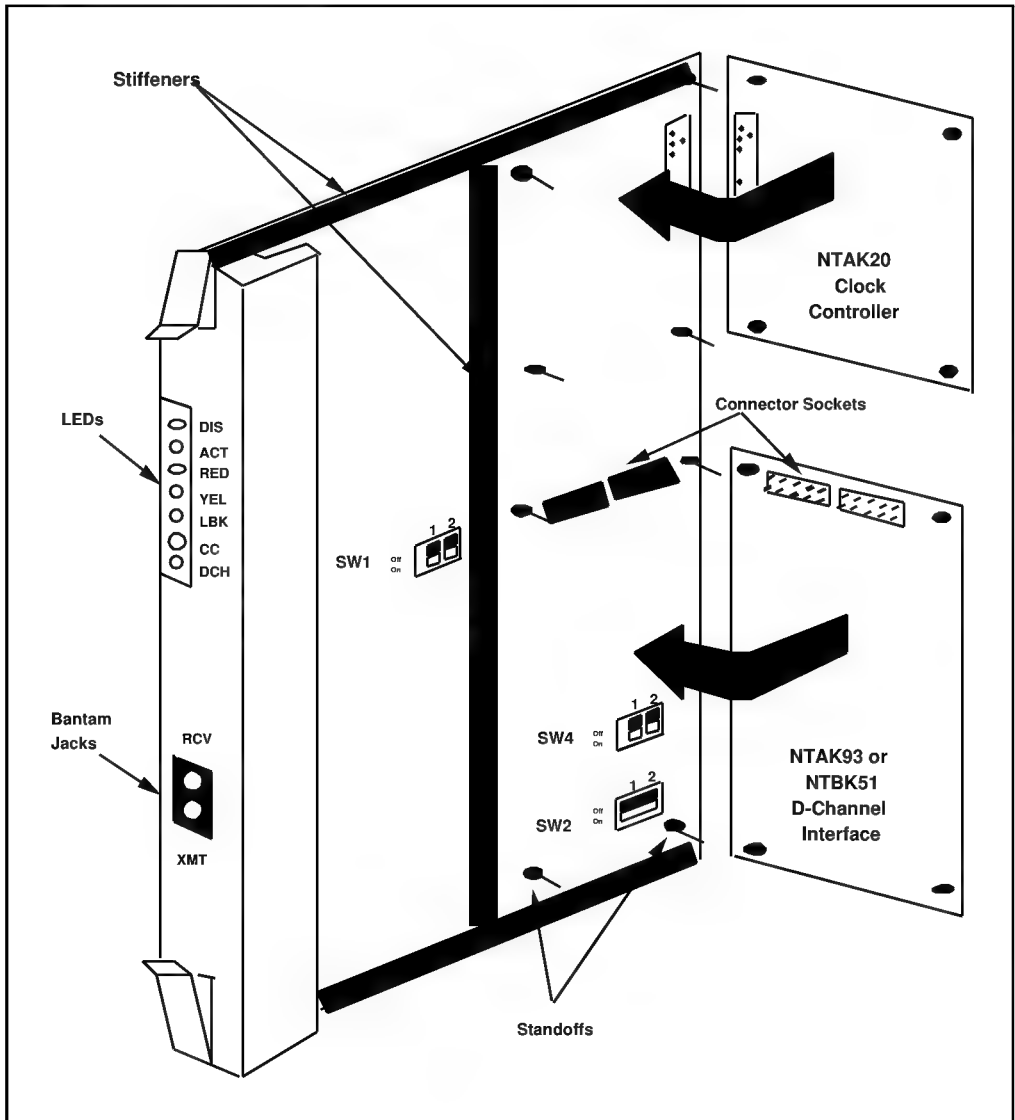
Install the NTAK93 or NTB51 daughterboard before the NTAK20 daughterboard. Work on a flat surface when mounting or removing daughterboards.

- 1 Visually inspect the connector pins on the underside of the daughterboard. Any pins that are bent should be re-aligned prior to mounting.
- 2 Place the NTB50 down flat on an anti-static pad.
- 3 From an overhead viewpoint, with the daughterboard parallel above the NTB50 and the connector pins aligned over the connector sockets, line up the mounting holes on the daughterboard (see the figure below) with the tops of the standoffs on the NTB50.
- 4 Slowly lower the daughterboard towards the NTB50, keeping the standoffs in line with all four holes, until the holes are resting on the tops of the four standoffs.

If more than a very slight amount of pressure is required at this point, the connector pins may not be aligned with the connector socket. If so, lift the daughterboard off the NTB50 and return to step 2.

- 5 Gently apply pressure along the edge of the board where the connector is located until the standoffs at the two corners adjacent to the connector snap into a locked position. Then press down on the two corners on the opposite side until they also are locked into place.

Figure 70
Daughterboard Installation



Removing the daughterboards from the NTB50

Use these guidelines to remove the NTAK20 and NTB51 or NTAK93 from the NTB50 PRI card. Because of the physical layout of the mother and daughterboards, the NTAK20 should be removed before the NTAK93 or NTB51.

- 1** Starting at the two corners opposite the connector, gently lift each corner out of the locking groove of the standoff.
- 2** At the two corners adjacent to the connector, gently lift the entire side until the mounting holes are clear of the locking groove of the standoff.
- 3** To remove the connector pins, grasp the edge of the board adjacent to the connector and lift gently.

If more than one NTB50 card is installed, the additional cards may not carry daughterboards, depending on the system configuration. At least one NTAK20 (per system) is always required, however.

Inserting the NTB50 into the main cabinet

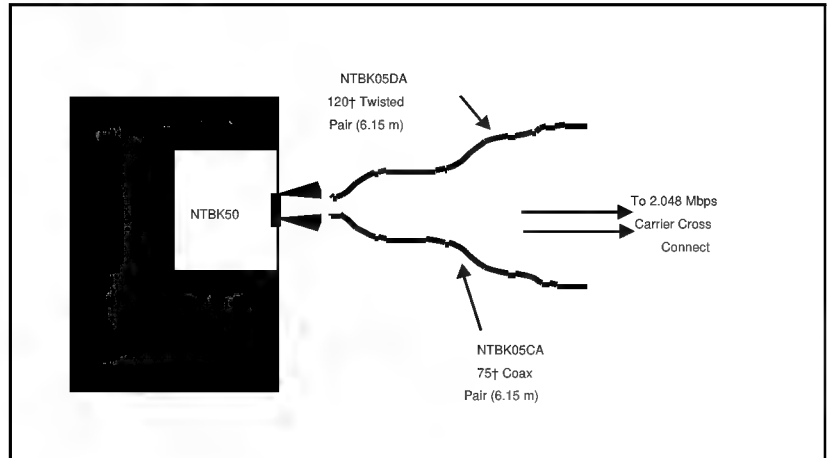
Slide the circuit card into any unused card slot 1 through 9 in the main cabinet. Secure the circuit card in the cabinet by locking the lock latch assemblies. The card number associated with a 2 Mb PRI card is based on the slot in which the card is installed.

Connecting the cables

Follow the instructions below to connect cables to the NTB50 PRI card.

- In the cabling area, located directly below the card cage, remove the retaining bar used to secure the MDF cables. Connect the NTB05DA/CA interface cable to the 50 pin Amphenol connector below the slot in which the NTB50 is installed. Re-install the retaining bar to secure the cable(s) in place.
- Terminate the NTB05DA/CA carrier cable as required.

Figure 71
2 Mb PRI Cabling



NTBK05DA pinouts

The pinouts for the NTBK05DA cable are as follows:

From: 50 pin MDF connector	To: 9 pin connector	Colour	Signal
pin 23	pin 6	Black	R0
pin 48	pin 7	White	T0
pin 50	pin 9	Bare	R0/T0 FGND
pin 24	pin 2	Black	R1
pin 49	pin 3	Red	T1
pin 25	pin 5	Bare	R1/T1 FGND

NTBK05CA pinouts

The pinouts for the NTBK05CA cable are as follows:

From: 50 pin MDF connector	To: Transmit coax connector	To: Receive coax connector	To: 50 pin MDF connector
pin 23	Inner conductor	—	—
pin 48	outer conductor	—	—
pin 24	—	Inner conductor	—
pin 49	—	outer conductor	—

PRI software programming

Use the following procedure to configure PRI loops, the DCHI/DDCH interface, the DCH link and ISDN trunk route and trunks (B-channels). No feature applications other than Basic Call Service are programmed.

Prompts which do not show a response can be left at default. For more information on any of these prompts, refer to Option 11 *Software guides*.

Overlay 17 is used to create, change or remove a logical D-Channel which is associated with:

- a D-channel handler interface (DCHI):
 - NTAK79 PRI card
 - NTAK02 SDI/DCH card
 - NTBK50 PRI card with the NTAK93 daughterboard
- a downloadable D-channel handler (DDCH) on an NTBK50 PRI card with the NTBK51 daughterboard.

Limitations

PRI loops must be configured before defining DCH links or PRI applications. The following restriction apply when configuring a D-Channel:

- The card slot number used for the DCHI/DDCH must be between 1-9.

- The port number must be set to 1.
- A primary D-Channel can not act as the backup D-Channel of another primary D-Channel.
- A primary D-Channel with a backup D-Channel can not be taken out. The craftperson must first take out the backup D-Channel.
- The D-Channel must be disabled if any DCH parameters are changed.
- Card type of the backup D-channel must be the same as the card type of the primary D-channel. (Example: an NTAK02 DCH can not act as a backup to an NTAK79 DCH. The backup must be another NTAK02).
- The MOV DCH command is not supported.

Procedure summary

Step	Overlay	Action
1	LD 17 (CFN)	Add a PRI loop.
2	LD 17 (CFN)	Add a DDCH/DCHI card.
3	LD 15 (CDB)	Define a PRI customer.
4	LD 16 (RDB)	Define a PRI service route.
5	LD 14 (TDB)	Define service channels (B channels) and PRI trunks.
6	LD 73 (PRI2)	Define clock controller parameters.
7	LD 73 (PRI2)	Define PRI parameters and thresholds. Note: In most cases, the settings should be left at their default values. However, if changes to these values are necessary, use this step to make them.
8	LD 73 (PRI2)	Change trunk pad category values.

1 Add a PRI loop. Use Overlay 17.

Prompt	Response	Description
REQ	CHG	
TYPE	CFN	configuration data block
CEQU	YES	changes to common equipment
PRI2	XXX	where XXX is the PRI2 digital card number (1-9)

2 Add a DCHI or DDCH. Use Overlay 17.

Prompt	Response	Description
REQ	CHG	
TYPE	CFN	configuration data block
ADAN	NEW DCH 1-15 CHG DCH 1-15 OUT DCH 1-15	Add a primary D-Channel port number. Any unused SDI port number Change a primary D-Channel Out the primary D-Channel
CTYP	DCHI/MSDL	DCHI for D-Channel configuration on the NTAK79, NTAK02, NTAK93 D-channel. MSDL for Downloadable D-Channel configuration (NTBK51 D-channel). The MSDL base and D-Channel application software are downloadable into the DDCH card.
CDNO	1-9	Card slot number to be used as the primary DDCH/DCHI
PORT	1	PORT must be set to "1"
DES	<CR>	Back-up DCHI port number, if required
DPNS	<CR>	Default is no
USR	PRI	D-channel is for ISDN PRI only. Note: 2.0 Mb only supports PRI or SHA user mode.

Prompt	Response	Description
IFC	SL1	Interface type is Meridian 1 - Meridian 1
DCHL	(1-9)	PRI card number which will be carrying the D-channel. Must match entry made for the "CDNO" associated with the "DCHI" prompt above
PRI2	<CR>	Additional PRI Loops controlled by this DCHI. Remember one DCHI can control up to 16 PRI loops going to the same destination. For the Option 11 system, the maximum limit is eight loops.
OTBF	1-(16)-127	number of output request buffers. Note: for a single PRI link, leave this prompt at default (16). Add 5 output request buffers per additional link.
SIDE	NET (USR)	Prompted only if IFC is set to SLI. Default is set to slave. NET = network, the controlling switch USR= slave to the controller Note: In X11 release 17 and earlier, enter MAS for NET and SLAV for USR.
RLS	XX	X11 software release of far-end. This is the current software release of the far end. If the far end has an incompatible release of software, it prevents the sending of application messages, i.e. for Network Ring Again.
RCAP	MSL	MSDL RCAP capability only applies to SL-1 interface and on release 18 or above.
OVL R	<CR>	Allow or disallow overlap receiving on a D-channel. Default is NO.
LAPD	YES,(NO)	change LAPD parameters. Enter carriage return if timers are to be left at default. The following timers are prompted only if LAPD is set to YES. (They can all be left at default during initial set-up.)
T23	1-(20)-31	interface guard timer checks how long the interface takes to respond. In units of 0.5 seconds (default 20 = 10 seconds).
T200	2-(3)-40	retransmission timer in units of 0.5 seconds (default 3 = 1.5 seconds).

Prompt	Response	Description
N200	1-(3)-8	maximum number of retransmissions
N201	4(260)	maximum number of octets in information field
K	1-(7)-32	maximum number of outstanding unacknowledged frames (NAKS)

3 Define a PRI customer. Use Overlay 15.

Prompt	Response	Description
REQ	NEW,CHG	
TYPE	CDB NET_DATA	customer data block Release 21 gate opener
CUST	0-31	customer number
LDN	XXXX	enter the customer's Listed Directory Number
AC2		Access Code 2. Enter call types (type of number) that use access code 2. Multiple responses are permitted. This prompt only appears on NARS equipped systems. If a call type is not entered here, it is automatically defaulted to access code 1.
	NPA	E.164 National
	NXX	E.164 Subscriber
	INTL	International
	SPN	Special Number
	LOC	Location Code
ISDN	YES	customer is equipped with ISDN
PNI	1-32700	customer private network identifier. This number must be unique to this customer in the private network. e.g. it is used as part of the setup message for feature operation such as Network Ring Again, Network ACD....Note that if set to zero (0), NRAG and NACD will not work.
HNPA (PFX1)	NPA	telephone area code for this Meridian 1. Sent as part of setup message as calling line identification.

Prompt	Response	Description
HNXX (PFX2)	NXX	telephone local exchange code for this Meridian 1. Sent as part of setup message as calling line identification.
HLOC	XXX	home location code (NARS)
LSC	1-9999	one to four digit Local Steering Code established in the Coordinated Dialing Plan (CDP). The LSC prompt is required for Calling Line I.D. and Network ACD.

4 Define a PRI service route. Use Overlay 16.

Prompt	Response	Description
REQ	NEW, CHG	
TYPE	RDB	route data block
TKTP	TIE	TIE trunk only, allowed between MSL-1.
DTRK	YES	digital trunk route
DGPT	PRI2	
ISDN	YES	ISDN option
MODE	PRI	route used for PRI only
PNI	1-32700	customer private network identifier-must be the same as the CDB PNI at far end.
IFC	SL1	interface type: Meridian 1 to Meridian 1
CHTY	BCH	signaling type- prompted if DTRK is YES. D-channel signaling for B-channels.
CTYP	<CR>	Call Type. Enter the call type to be associated with the outgoing route for direct dialing using the trunk access code (instead of NARS access code) See the "X11 Software Guide - Including Supplementary Features" for a listing of possible responses.

Prompt	Response	Description
INAC	YES	Insert Access Code. Permits the NARS AC1 or AC2 access code to be re-inserted automatically on an incoming ESN call. This prompt only appears on a TIE route and must be set to "YES" in order for features such as Network ACD to function. On an existing ESN network, setting this prompt to "YES" may also require modifying the Digit Manipulation Index (DMI) associated with this route at the far end (so that the Access Code doesn't get re-inserted twice). The INSERT prompt (INST) is bypassed if INAC is set to YES.

5 Define service channels and PRI trunks. Use Overlay 14.

Prompt	Response	Description
REQ	NEW,CHG	Note: when assigning several members at once use the multiple create command NEW XX.
TYPE	TIE	TIE trunk only, allowed between MSL-1.
TN	c ch	enter the PRI trunk card (c) and channel number (ch). c = 1-9, ch = 1-30
RTMB	RR MM	route (created in step 5) (RR) and member number (MM).
INC		
TKID		

6 Define clock controller parameters. Use Overlay 73.

Free-run is used when this Meridian PBX serves as the clock source master for the private network. This is only prompted if the CC has been physically connected to the system. See the “*Network clocking*” chapter for more details on clocking.

Prompt	Response	Description
REQ	CHG	
TYPE	PRI2	2 Mb PRI
FEAT	SYTI	System timers
CLKN	1-9	Card slot number of the PRI circuit card which will have the active clock controller.
PREF	1-9	Primary reference source for clock controller. Enter the PRI card number of the PRI card which will have an active clock controller. This is the PRI which the clock controller will use as it's primary source to synchronize (to track) the system network clock. A carriage return <CR> here signifies the system will operate in free-run (non-tracking).
SREF	1-9	Secondary reference source for clock controller—prompted only if primary source is not free-run. Enter the card number of the PRI card that is to be used as the secondary clock reference. This is the PRI link that the clock controller will use as it's secondary source to synchronize (to track) the network clock. It is only used when unable to track on the primary source (i.e. too many slips).
CCAR	0-(15)	Clock Controller Audit Rate. Enter the time (in minutes) between normal CC audits.

7 Define PRI parameters and thresholds. Use Overlay 73.

Prompt	Response	Description
REQ	CHG	
TYPE	PRI2	2 Mb PRI
FEAT	LPTI	
LOOP	X	X is the slot number of the 2 Mb PRI card.
MFF	AFF, (CRC)	Alternate mode or CRC multi-frame mode
ALRM	(REG), ALT	Default or alternate alarms selected
G10S		
SLP	mc mt oc ot	Slip error count, <i>mc</i> —Maintenance threshold slip count, 1-(5)-255 <i>mt</i> —Maintenance threshold time, default 24 hours, see Note after Step 3 <i>oc</i> —Out-of-service threshold slip count, 1-(30)-255 <i>ot</i> —Out of service threshold time, default 1 hour, see Note after Step 3
BPV	n1 n2	Bipolar violation error count, 1-(128)-255 for n1, 1-(122)-255 for n2. n1 is multiplied by 16 to obtain the actual count, giving an actual count range of 16-4080.
CRC	n1 n2	Cyclic redundancy check error count 1-(201)-255 for n1, 1-(97)-255 for n2. n1 is multiplied by 4 to obtain the actual count, giving an actual count range of 4-1020.
FAP	n1 n2	Frame alignment problem error count 1-(28)-255 for n1, (1)-255 for n2..
RATS	1-(10)-15	Number of seconds firmware has to check BPV/CRC/FAP for excessive error rate.

Prompt	Response	Description
GP2	T2 mt dt ct ot	Group 2 error thresholds. This is the maximum amount of time that can occur before software checks the associated thresholds of 120 to 32,640 msec and rounds it to the closest multiple of 128 msec. T2 = Error count values are in the range 1-(20)-255 mt = Maintenance threshold time (MNT)(default =100S) dt = No new data calls threshold time (NNDC)(default =12S) ct = No new calls threshold time (NNC)(default =12S) ot = Out of service threshold time (OOS)(default =4S). Note : The following requirements must be met for input mt = >dt = >ct = >ot. Note : Threshold times must be one of
MNG1	nnnM	Maintenance Guard time Group 1 default = 15M
NCG1	nnnM	No New Calls Guard time Group 1 default = 15M
OSG1	nnnM	Out Of Service Guard time Group 1 default = 15M
MNG2	nnnS	Maintenance Guard time Group 2 default = 15S
NCG2	nnnS	No New Calls Guard time Group 2 default = 15S
OSG2	nnnS	Out Of Service Guard time Group 2 default = 15S
PERS	ttt	Persistence Timer for Group II problems. Enter 0 - 256 msec in increments of 2 msec. Default is 50 (=100ms).
CLRS	ttt	Clearance Timer for Group II problems. Enter 0 - 256 msec in increments of 2 msec. Default is 50 (=100ms).

Prompt	Response	Description
OOSC	nnn	Out of Service Counter. Range for <i>nnn</i> of 0-255 with a default of 5.

8 Use Overlay 73 to change trunk pad category values

Prompt	Response	Description
REQ	CHG	
TYPE	PRI2	2 Mb PRI
FEAT	PADS	
PDCA	#	PAD table-0 is default and is hard coded
The following prompts define the pad levels. The receiving pad code is <i>r</i> and the transmission pad code is <i>t</i>. These entries have the range 0-15. The pad values (in decibels) relating to these codes are shown after this table.		
ONP	r t	On-premises extension
DSET	r t	Meridian Digital set (prompted only if the 2 Mb Gateway feature is equipped) Author's Note—p7/dave/gateway
OPX	r t	Off-premises extension
DTT	r t	Digital TIE trunks
SDTT	r t	digital Satellite TIE trunks
NTC	r t	Nontransmission compensated
TRC	r t	Transmission compensated
DCO	r t	digital COT, FEX, WAT, and DID trunks
VNL	r t	VIA NET LOSS
DTO	r t	2 Mb PRI2 digital TOLL office trunks
ACO	r t	Analogue CO or WATS trunks
AFX	r t	Analogue FEX trunks
ADD	r t	Analogue DID trunks

Prompt	Response	Description
SATT	r t	analogue satellite TIE trunks
ATO	r t	analogue TOLL office trunks
PRI2	r t	2 Mb 2 Mb PRI trunk (prompted only if the 1.5/2 Mb Gateway feature is equipped and TYPE=2 Mb PRI) Author's Note—p7/dave/gateway
XUT	r t	analogue CO trunk (prompted only if the 1.5/2 Mb Gateway feature is equipped and TYPE=PRI2) Author's Note—p7/dave/gateway
XEM	r t	analogue TIE trunk (prompted only if the 1.5/2 Mb Gateway feature is equipped and TYPE=PRI2) Author's Note—p7/dave/gateway

The following are the pads available to 2 Mb PRI. Positive dB represents loss and negative dB represents gain.

code	0	1	2	3	4	5	6	7
value (dB)	0.0	+1.0	+2.0	+3.0	+4.0	+5.0	+6.0	+7.0
code	8	9	10	11	12	13	14	15
value (dB)	+8.0	+9.0	+10.0	+11.0	+12.0	+13.0	+14.0	-1
code	16	17	18	19	20	21	22	23
value (dB)	-2	-3	-4	-5	-6	-7	-8	-9
code	24	25	26					
value (dB)	-10	idle	+0.6					

PRI software programming: Option 11 to Central Office (ISA)

Introduction

Connection to a Central Office can be accomplished using three methods:

- 1 **Dedicated channels** (similar to Digital Trunking-DTI) but with Calling Line Identification--CLID, speed of call setup and out-of-band signaling.
- 2 **Call by Call (ISA)** service selection **without** maximum or minimum settings for each trunk type. This arrangement would ultimately provide blockage to some routes.
- 3 **Call by Call (ISA)** service selection **with** maximum and minimum settings for each trunk type. This may also be referred to as **Dynamically allocating** trunk types on a call-by-call basis.

Note that a combination of options is also possible on the same link. An example is dynamically allocating some channels, while providing a number of dedicated channels.

Options 2 and 3 are explained in detail in this section.

Purpose

Accessing an ISA member

Integrated Service Access (Call by Call or Dynamic Channel Assignment) simply provides a path for the various services using it. Therefore the ISA MEMBER IS NEVER ACCESSED DIRECTLY. Instead, Service Routes are defined (COT, DID, WATS, FX and TIE) and these are accessed through the normal fashion (see example that follows).

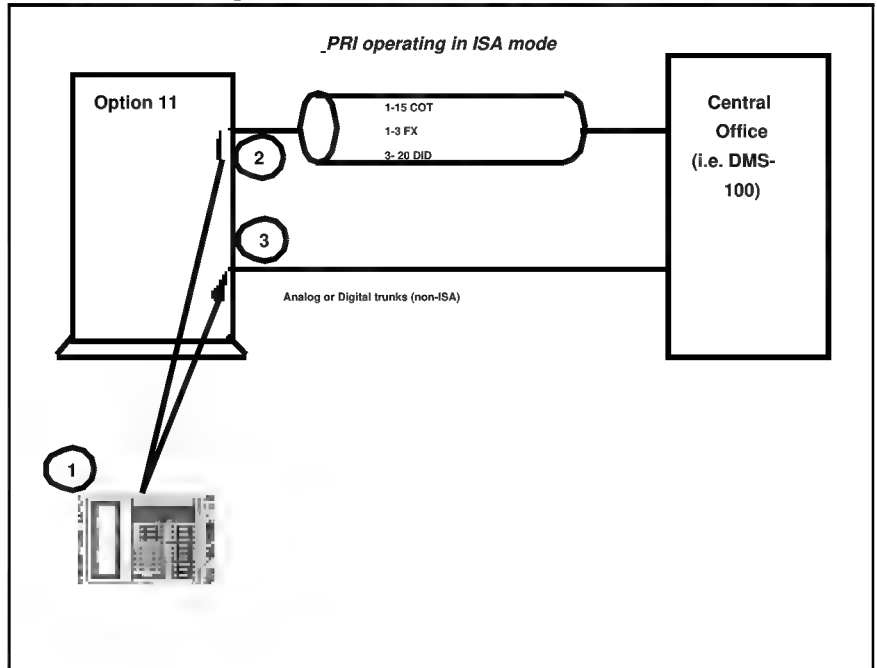
Outgoing Calls: Since ISDN requires some form of ESN (CDP or/and NARS), then the Route List Tables (ESN LD 86) include the Service route(s). Therefore, the Meridian 1 software performs the digit translation and sends the call out on an ISA route associated with the service route selected. This feature is transparent.

Incoming Calls: Similar translation is performed by the Central Office and an ISA channel is selected based on the service required. This feature is transparent.

Limitations

The caller is prevented from dialing the access code of an ISA route directly. It is also possible to step to a standard trunk route (NON-ISA) when all ISA channels are busy. This is done by using the STEP prompt (for direct access) or as part of the route list table (ESN-LD 86).

Figure 72
ISA Call Routing



- 1 Callers usually access the PRI Service Route by dialing the usual ESN number (NARS or CDP).
- 2 The Service Route does not have any trunk members of its own and therefore selects an ISA "B" channel.
- 3 In the event that all ISA "B" channels are busy or the Service Route MAX setting has been reached (i.e. 15 outgoing COT calls), stepping to a non-ISA trunk member (if so equipped) is possible.

Dependencies

Basic PRI configuration must be performed before Integrated Services Access (ISA) is defined (Steps 1, 2, 3, 4 and 8 under programming the PRI-ISA which follows). An ISA route and associated ISA trunks are then defined, followed by service routes. Service routes (COT, DID, FX, WATS, TIE) DO NOT HAVE TRUNK MEMBERS but utilize the ISA trunk members. Therefore the ISA trunks are shared by the various service routes associated with them on a call-by-call basis.

ISA Prompt Assignments

The following few pages identify and describe some of the most important prompts which are used to control the Dynamic Channel Assignment mechanism.

- a MIN and MAX
- b SID
- c NSF

MIN and MAX

You can control the number of simultaneous calls of a certain type (from a certain service route) through an ISA route by defining the Maximum and Minimum settings found in the service routes. You can define a maximum number of calls allowed per service route. In addition, you can define a minimum number of "B" channels that are ready for use by a service route (in other words channels which are reserved by a service route). The MIN and MAX prompts appear when the NSF prompt is set to YES in the ISA route.

The MIN and MAX prompts in LD 16 limit the minimum and maximum simultaneous calls associated with each service route. The rule of thumb for setting these two threshold is as follows:

MIN--The sum of all MIN values of the service routes associated with an ISA route MUST never exceed the number of "B" channels (ISA trunks) defined for the ISA route.

Sum of all the MIN values = or < total "B" channels.

MAX--The MAX settings for any service route:

MAX for service route "X" = or < Total "B" channels - (sum of all the MINs except this service route).

If the service route exceeds its maximum number of simultaneous calls allowed, or all the ISA "B" channels are busy, then you can specify an overflow route in LD 16 (STEP prompt) or LD 86 Route List Table Entry. The route number for the step prompt is not permitted to be an ISA route number or a service route number.

Service Identifier (SID)

In addition to the call type (route type), each call is identified by a service identifier (SID) which is used by the Meridian 1 and the CO for routing. The SID prompt is available when the NSF prompt is set to YES. These service identifier must be set up in coordination with the CO on a per route basis. The function of the SID is simply to identify the Service Route being used; since the Route number as we know it (LD 16) as programmed in the Meridian 1 does not mean anything to the CO

Note that what we call SID on the Meridian 1, is referred to by the DMS table as "FACNUM".

Network Service Facility (NSF)

NSF=NO

Disabling the Network Service Facility provides the Call-by-Call Pool of trunks without the MIN and MAX settings (therefore no control as to the number of "B" channels used for any one service). Additionally, when you assign NSF to NO in LD 16, a route number for COTR and TIER should also be assigned. The COTR can be a route number for an incoming CO or incoming DID route. It is used for public calls. For incoming public calls, if COTR is a CO route, it is routed to the attendant. If it is a DID route, it translates the 3 or 4 digits. For private calls (TIER), the called number is translated based on the programming for the Tie service route in overlay 16 (i.e. INAC) and ESN digit manipulation table if appropriate.

NSF=YES

This is the preferred method which provides control over the allocation of ISA "B" channels for the various Service Routes. When the NSF prompt is YES, then a route for COTR and WATR should be assigned. The COTR can be a route number for an incoming CO or incoming DID route same as above. The WATR is the route used for WATS service. The TIER prompt does not appear and TIE calls are handled based on their SID. Additionally, when NSF is set to YES, the MIN and MAX prompts must be programmed as explained earlier. When the MAX value is reached in a service route, the All Trunks Busy counter is incremented. (The ATB count is not incremented when NSF is NO). The ATB value is provided during the printing of traffic reports. The ATB counter of an ISA route is also incremented when the last "B" channel of the ISA is busied. This occurs regardless of whether the NSF prompt is YES or NO.

Configuring Option 11 to Central Office (ISA)

Applicability

Use the following procedure to configure ISA between Option 11 and a CO.

Prompts that do not show a response can be left at default. For more information on any of these prompts, refer to Option 11 *Software guides*.

Limitations

PRI loops must be configured before defining DCH links or PRI applications.

Procedure summary

Step	Overlay	Action
1	LD 17 (CFN)	Add a PRI loop.
2	LD 17 (CFN)	Add a DCHI/DDCH card.
3	LD 15 (CDB)	Define a PRI customer.
4	LD 16 (RDB)	Define a PRI service route.
5	LD 14 (TDB)	Define service channels (B channels) and PRI trunks.
6	LD 73 (PRI2)	Define clock controller parameters.
7	LD 73 (PRI2)	Define PRI parameters and thresholds.
8	LD 73 (PRI2)	Change trunk pad category values. In most cases, the settings should be left at their default values. However, if changes to these values are necessary, use this step to make them.

1 Add a PRI loop. Use Overlay 17.

Prompt	Response	Description
REQ	CHG	
TYPE	CFN	configuration data block
CEQU	YES	changes to common equipment
PRI2	XXX	where XXX is the DTI/PRI digital card number (1-9)
MODE	PRA	select Primary Rate Interface mode

2 Add a DCHI or DDCH. Use Overlay 17.

Prompt	Response	Description
REQ	CHG	
TYPE	CFN	Configuration data block
ADAN	NEW DCH 1-15 CHG DCH 1-15 Out DCH 1-15	Add a primary D-Channel port number. Any unused SDI port number Change a primary D-Channel Out the primary D-Channel
CTYP	DCHI/MSDL	DCHI for existing D-Channel configuration. (NTAK93 D-channel) MSDL for Downloadable D-Channel configuration (NTBK51 D-channel). The MSDL base and D-Channel application software will be downloadable into the DDCH card.
CDNO	1-9	Card slot number to be used as the primary DDCH/DCHI
PORT	1	PORT must be set to "1"
DES	<CR>	Back-up DCHI port number, if required
DPNS	NO	Default is no
USR	PRI	PRI: D-channel is for ISDN PRI only

Prompt	Response	Description
IFC	(D100) S100 SL1 ESS4 ESS5 AXEA SS12 SWIS D250 1TR6 AXES NUME EURO ISIG ESIG TCNZ	Interface type for the route DMS-100 SL-100 Meridian SL-1 AT&T ESS#4 AT&T ESS#5 Australian AXE-10 Norwegian SYS-12 SwissNet DMS-250 1 TR 6 Swedish AXE-10 Numeris France EuroISDN interface Interface ID for ISO QSIG Interface ID for ETSI QSIG Telecom New Zealand (NEAX-61)
DCHL	1-9	PRI card number which will be carrying the D-channel. Must match entry made for the "CDNO" associated with the "DCHI" prompt above
PRI2	<CR>	Additional PRI Loops controlled by this DCHI. Remember one DCHI can control up to 16 PRI loops going to the same destination. For the Option 11 system, the maximum limit is eight loops.
OTBF	1-(16)-127	number of output request buffers. Note: for a single PRI link, leave this prompt at default (16). Add 5 output request buffers per additional link.
SIDE	NET (USR)	Prompted only if IFC is set to SLI. Default is set to slave. NET = network, the controlling switch USR= slave to the controller Note: In X11 release 17 and earlier, enter MAS for NET and SLAV for USR.

Prompt	Response	Description
RLS	20	X11 software release of far-end. This is the current software release of the far end. If the far end has an incompatible release of software, it prevents the sending of application messages, i.e. for Network Ring Again.
RCAP	MSL	MSDL RCAP capability only applies to SL-1 interface and on release 18 or above.
OVL R	<CR>	Allow or disallow overlap receiving on a D-channel. Default is NO.
LAPD	YES,(NO)	change LAPD parameters. Enter carriage return if timers are to be left at default value. The following timers are prompted only if LAPD is set to YES. The following can all be left at default during initial set-up.
T23	1-(20)-31	interface guard timer checks how long the interface takes to respond. In units of 0.5 seconds (default 20 = 10 seconds).
T200	2-(3)-40	retransmission timer in units of 0.5 seconds (default 3 = 1.5 seconds).
N200	1-(3)-8	maximum number of retransmissions
N201	4(260)	maximum number of octets in information field
K	1-(7)-32	maximum number of outstanding unacknowledged frames (NAKS)

3 Define a PRI customer. Use Overlay 15.

Prompt	Response	Description
REQ	NEW,CHG	
TYPE	CDB NET_DATA	customer data block Release 21 gate opener
CUST	0-31	customer number
LDN	XXXX	enter the customer's Listed Directory Number
ISDN	YES	customer is equipped with ISDN
PNI	1-32700	customer private network identifier. This number MUST be unique to this customer in the private network. e.g. it is used to as part of the setup message for feature operation such as Network Ring Again, Network ACD...
HNPA	NPA	telephone area code for this Meridian 1. Sent as part of setup message as calling line identification.
HNXX	NXX	telephone local exchange code for this Meridian 1. Sent as part of setup message as calling line identification.
HLOC	XXX	home location code (NARS)
LSC	1-9999	one to four digit Local Steering Code established in the Coordinated Dialing Plan (CDP). The LSC prompt is required for Calling Line I.D. and Network ACD.
AC2		Access Code 2. Enter call types (type of number) that use access code 2. Multiple responses are permitted. This prompt only appears on NARS equipped systems. If a call type is not entered here, it is automatically defaulted to access code 1.
	NPA	E.164 National
	NXX	E.164 Subscriber
	INTL	International
	SPN	Special Number
	LOC	Location Code

4 Configure the ISA route. Use Overlay 16

Prompt	Response	Description
REQ	NEW, CHG	
TYPE	RDB	route data block
TKTP	ISA	create an ISA trunk route
DTRK	YES	digital trunk route
DGPT	PRI2	
ISDN	YES	ISDN option
MODE	PRI	route used for PRI only
PNI	1-32700	customer private network identifier-must be the same as the CDB PNI at the far end.
IFC	(D100)	interface to DMS-100
	S100	interface to SL-100
	SL1	Meridian SL-1
	ESS4	interface to AT&T ESS#4
	ESS5	interface to AT&T ESS#5
	AXEA	interface to Australian AXE-10
	SS12	interface to Norwegian SYS-12
	SWIS	SwissNet
	D250	interface to DMS-250
	1TR6	interface to 1 TR 6
	AXES	interface to Swedish AXE-10
	NUME	interface to Numeris France
	EURO	EuroISDN interface
	ISIG	Interface ID for ISO QSIG
	ESIG	Interface ID for ETSI QSIG
	TCNZ	Telecom New Zealand (NEAX-61)
NSF	YES,(NO)	Network Service facility.
COTR	0-511	incoming or combination DID/CO route number--prompted if NSF is set to YES or NO.
TIER	0-511	incoming or combination TIE route number--prompted if NSF is NO.

Prompt	Response	Description
WATR	0-511	incoming or combination WATS route number--prompted if NSF is YES.

5 Configure the ISA trunks. Use Overlay 14

Prompt	Response	Description
REQ	NEW,CHG	
TYPE	ISA	ISA trunk type
TN	c ch	enter the DTI/PRI trunk card (c) and channel number (ch). c = 1-9, ch = 1-30
RTMB	RR MM	ISA route (created in step 5) (RR) and member number (MM).

6 Define clock controller parameters. Use Overlay 73.

Free-run is used when this Meridian PBX serves as the clock source master for the private network. This is only prompted if the CC has been physically connected to the system. See the “*Network clocking*” chapter for more details on clocking.

Prompt	Response	Description
REQ	CHG	
TYPE	PRI2	2 Mb PRI
FEAT	SYTI	System timers
CLKN	1-9	Card slot number of the PRI circuit card which will have the active clock controller.
PREF	1-9	Primary reference source for clock controller. Enter the PRI card number of the PRI card which will have an active clock controller. This is the PRI which the clock controller will use as it's primary source to synchronize (to track) the system network clock. A carriage return <CR> here signifies the system will operate in free-run (non-tracking).

Prompt	Response	Description
SREF	1-9	Secondary reference source for clock controller—prompted only if primary source is not free-run. Enter the card number of the PRI card that is to be used as the secondary clock reference. This is the PRI link that the clock controller will use as it's secondary source to synchronize (to track) the network clock. It is only used when unable to track on the primary source (i.e. too many slips).
CCAR	0-(15)	Clock Controller Audit Rate. Enter the time (in minutes) between normal CC audits.

7 Define PRI parameters and thresholds. Use Overlay 73.

Prompt	Response	Description
REQ	CHG	
TYPE	PRI2	2 Mb PRI
FEAT	LPTI	
LOOP	X	X is the slot number of the 2 Mb PRI card.
MFF	AFF, (CRC)	Alternate mode or CRC multi-frame mode
ALRM	(REG), ALT	Default or alternate alarms selected
G10S		
SLP	mc mt oc ot	Slip error count, <i>mc</i> —Maintenance threshold slip count, 1-(5)-255 <i>mt</i> —Maintenance threshold time, default 24 hours, see Note after Step 3 <i>oc</i> —Out-of-service threshold slip count, 1-(30)-255 <i>ot</i> —Out of service threshold time, default 1 hour, see Note after Step 3

Prompt	Response	Description
BPV	n1 n2	Bipolar violation error count, 1-(128)-255 for n1, 1-(122)-255 for n2. n1 is multiplied by 16 to obtain the actual count, giving an actual count range of 16-4080.
CRC	n1 n2	Cyclic redundancy check error count 1-(201)-255 for n1, 1-(97)-255 for n2. n1 is multiplied by 4 to obtain the actual count, giving an actual count range of 4-1020.
FAP	n1 n2	Frame alignment problem error count 1-(28)-255 for n1, (1)-255 for n2..
RATS	1-(10)-15	Number of secs. firmware has to check BPV/CRC/FAP for excessive error rate.
GP2	T2 mt dt ct ot	Group 2 error thresholds. This is the maximum amount of time that can occur before software checks the associated thresholds of 120 to 32,640 msec and rounds it to the closest multiple of 128 msec. T2 = Error count values are in the range 1-(20)-255 mt = Maintenance threshold time (MNT)(default =100S) dt = No new data calls threshold time (NNDC)(default =12S) ct = No new calls threshold time (NNC)(default =12S) ot = Out of service threshold time (OOS)(default =4S). Note : The following requirements must be met for input: mt = >dt = >ct = >ot. Note : Threshold times must be one of the following nnnnT, nnnS, nnnM, or nnH, where nnnn is an integer and T,S,M, or H show the
MNG1	nnnM	Maintenance Guard time Group 1 default = 15M
NCG1	nnnM	No New Calls Guard time Group 1 default = 15M
OSG1	nnnM	Out Of Service Guard time Group 1 default = 15M

Prompt	Response	Description
MNG2	nnnS	Maintenance Guard time Group 2 default = 15S
NCG2	nnnS	No New Calls Guard time Group 2 default = 15S
OSG2	nnnS	Out Of Service Guard time Group 2 default = 15S
PERS	ttt	Persistence Timer for Group II problems. Enter 0 - 256 msec in increments of 2 msec. Default is 50 (=100ms).
CLRS	ttt	Clearance Timer for Group II problems. Enter 0 - 256 msec in increments of 2 msec. Default is 50 (=100ms).
OOSC	nnn	Out of Service Counter. Range for <i>nnn</i> of 0-255 with a default of 5.

8. Use Overlay 73 to change trunk pad category values

Prompt	Response	Description
REQ	CHG	
TYPE	PRI2	2 Mb PRI
FEAT	PADS	
PDCA	#	PAD table-0 is default and is hard coded
The following prompts define the pad levels. The receiving pad code is <i>r</i> and the transmission pad code is <i>t</i>. These entries have the range 0-15. The pad values (in decibels) relating to these codes are shown after this table.		
ONP	r t	On-premises extension
DSET	r t	Meridian Digital set (prompted only if the 2 Mb Gateway feature is equipped) Author's Note—p7/dave/gateway
OPX	r t	Off-premises extension
DTT	r t	Digital TIE trunks

Prompt	Response	Description
SDTT	r t	digital Satellite TIE trunks
NTC	r t	Nontransmission compensated
TRC	r t	Transmission compensated
DCO	r t	digital COT, FEX, WAT, and DID trunks
VNL	r t	VIA NET LOSS
DTO	r t	2 Mb PRI2 digital TOLL office trunks
ACO	r t	Analogue CO or WATS trunks
AFX	r t	Analogue FEX trunks
ADD	r t	Analogue DID trunks
SATT	r t	analogue satellite TIE trunks
ATO	r t	analogue TOLL office trunks
PRI2	r t	2 Mb 2 Mb PRI trunk (prompted only if the 1.5/2 Mb Gateway feature is equipped and TYPE=2 Mb PRI) Author's Note—p7/dave/gateway
XUT	r t	analogue CO trunk (prompted only if the 1.5/2 Mb Gateway feature is equipped and TYPE=PRI2) Author's Note—p7/dave/gateway
XEM	r t	analogue TIE trunk (prompted only if the 1.5/2 Mb Gateway feature is equipped and TYPE=PRI2) Author's Note—p7/dave/gateway

The following are the pads available to 2 Mb PRI. Positive dB represents loss and negative dB represents gain.

code	0	1	2	3	4	5	6	7
value (dB)	0.0	+1.0	+2.0	+3.0	+4.0	+5.0	+6.0	+7.0
code	8	9	10	11	12	13	14	15
value (dB)	+8.0	+9.0	+10.0	+11.0	+12.0	+13.0	+14.0	-1
code	16	17	18	19	20	21	22	23
value (dB)	-2	-3	-4	-5	-6	-7	-8	-9
code	24	25	26					
value (dB)	-10	idle	+0.6					